Claims

1. A compound lens (30, 60, 70) for use in an array (12, 14, 16) of such lenses comprising at least two lens elements including a front lens element (32, 62, 72) having a front lens surface (32a, 62a, 72a) which is the largest diameter lens surface in the compound lens, characterised in that the exit pupil of the compound lens is bounded by and lies in the plane (46) of the edge of said front lens surface.

2. A compound lens according to claim 1 wherein the aperture stop of the lens lies in front of the lens elements of the compound lens other than the front lens element (32, 62, 72).

3. A compound lens according to claim 1 wherein the front lens element (32, 62, 72) has a rear lens surface (32b, 62b, 72b) and the aperture stop of the compound lens lies in a plane (40) which intersects the optical axis (42) of the compound lens at the rear lens surface.

4. A compound lens according to any one of the preceding claims wherein the front lens element is a compound lens.

5. A compound lens according to any one of claims 1 to 3 wherein the front lens element is a single lens (32, 62, 72).

6. A compound lens according to any one of the preceding claims wherein the front lens element (32, 62, 72) is the largest diameter lens element in the compound lens.

7. A compound lens according to any one of the preceding claims wherein a rear lens surface (32b, 62b, 72b) of the front lens element (32, 62, 72) is concave.

8. A compound lens according to any one of the preceding claims wherein the front lens surface (32a, 62a, 72a) of the front lens element (32, 62, 72) is convex.

9. A projector (2, 4, 6) for use in an array of such projectors comprising a compound lens (12, 14, 16) according to any one of the preceding claims.

10. An autostereo projection system comprising an array of projectors (2, 4, 6) according to claim 9.

11. A method of designing a compound lens (30, 60, 70) for use in an array of such lenses comprising the steps of:

defining the material of a front lens element (32, 62, 72) of the compound lens, the diameter of a front lens surface (32a, 62a, 72a) of the front lens element, the radius of curvature of the front lens surface and a rear lens surface (32b, 62b, 72b) of the front lens element and defining the location of an exit pupil of the compound lens to be bounded by and in the plane (46) of the edge of said front lens surface.

based on the above defined parameters, tracing the location and magnitude of an aperture stop of the compound lens by tracing the marginal ray height through the front lens element using ray tracing means.

repeating the above steps until the marginal ray height traced through the front lens element is highest at the exit pupil and then fixing the above defined parameters.

defining the diameters of the remaining lens surfaces (c, d, e, f, g, h) of the compound lens to be less that of the front lens surface (32a, 62a, 72a) of the front lens element and defining the functionality of the compound lens, and

using ray tracing means to design the remainder of the compound lens in such a way that the remaining lens surfaces do not alter the relationship between the exit pupil and the marginal ray height through the front lens element as defined above.

12. A method according to claim 11 wherein the parameters defined in the first step of the method are only fixed when the diameter of the aperture stop is less than the diameter of the exit pupil.

13. A method according to claim 11 or 12 wherein the step of defining the diameter of the front lens surface (32a, 62a, 72a) of the front lens element (32, 62, 72) comprises the step of defining the diameter of the front lens element.

14. A method according to any one of claims 11 to 13 wherein the step of defining the functionality of the compound lens comprises the step of defining the compound lens as a finite conjugate lens with specified object and image distances.